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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/716,445	11/21/2000	Hitoshi Okamoto	046601-5077	8225

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EXAMINER

SUKHAPHADHANA, CHRISTOPHER T

ART UNIT	PAPER NUMBER
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2625

DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/716,445

Applicant(s)

OKAMOTO, HITOSHI

Examiner

Christopher T. Sukhaphadhana

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Objections

1. **Claims 2, 17, and 18** are objected to because of the following informalities: In regards to **claim 2**, consider inserting --pieces-- after “image data” on lines 3 and 4 of the claim. In regards to **claims 17 and 18**, the claim language seems awkward (e.g. “of each cluster, of the image data pieces”). Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-3, 6-9, 11, 12, and 16-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, newly cited, “Yaung”) in combination with Desai et al (U.S. Patent 6,072,904, newly cited, “Desai”).

4. In regards to **claim 1**, Yaung discloses an image data sorting device (Fig 1) comprising: a characteristic value extraction unit (ref no 308, Fig 3, and col 3, line 49) that extracts a characteristic value of an image data piece from the image data piece; a relation evaluation unit (ref no 316, Fig 3, and col 4, line 58) that evaluates a mutual relation between the characteristic values that the characteristic value extraction unit extracts from plural image data pieces; and a clustering unit (ref no 318, Fig 3, and col 5, line 3) that executes clustering to events expressed

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by the characteristic values of the plural image data pieces on the basis of an evaluation result of the relation acquired by the relation evaluation unit.

Yaung does not expressly disclose a sorting register as claimed. However, Yaung does teach in col 5, line 21, that image objects corresponding to the image object identifiers in one or more clusters may then be easily retrieved and visually displayed on visual output device. Yaung does not expressly teach how the image objects in the clusters are displayed or their manner of presentation.

Desai teaches in col 5, line 65, a sorting register unit that sorts the plural image data pieces on the basis of a result of clustering by the clustering unit. Specifically, Desai teaches a sorted list wherein the identifiers of the images are placed in the list in order of ascending distance from the target histogram vector. This ordered list is returned for presentation of the images to the user, typically by displaying the first ten closest pictures, then the next 10, etc.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Desai's sorting register unit into Yaung's image data sorting device because it would present the user with images in a relevant order. These two teachings are compatible in the sense that Desai (col 5, line 63) uses a distance between target histogram vector and data base image histogram vectors as a measure of relevance, while Yaung (col 4, line 67) uses a similarity value as a measure of relevance.

5. In regards to **claim 2**, Yaung further discloses the device wherein: the characteristic extraction unit extracts, as the characteristic value of the image data, n types of characteristic value vectors (col 3, line 49) expressed by an I_j dimensional vector (col 6, line 20) from the image data; and the relation evaluation unit, synthesizing (col 4, line 57) n types of the

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characteristic value vectors as to each of the n types of the characteristic value vectors that the characteristic value extraction unit extracts from the plural image data pieces, evaluates the relation (col 4, line 64) between the image data pieces in a synthesis result.

6. In regards to **claim 3**, Yaung further discloses in col 5, line 3, and Fig 5, "cluster J", the device wherein the clustering unit executes clustering by means of a non-hierarchical method based on a cluster number.

7. In regards to **claim 6**, Yaung further discloses in col 5, line 9, "threshold criteria data" the clustering unit executing clustering by means of a crisp technique that does not employ the fuzzy theory.

8. In regards to **claim 7**, Yaung further discloses in Fig 5, "cluster J", the clustering unit including a cluster number specifying unit that specifies a cluster number when executing clustering.

9. In regards to **claim 8**, Yaung further discloses the device further comprising: an image storage unit (ref no 106, Fig 1) that stores plural image data pieces; and an image management unit (ref no 202, Fig 2) that manages the plural image data pieces stored in the image storage unit on the basis of a sorting result by the sorting register unit.

10. In regards to **claim 9**, Yaung further discloses in col 4, lines 15-26, the image management unit managing the plural image data pieces stored in the image storage unit on the basis of the sorting result by the sorting register unit and attribute information relating to the image data pieces, which are given to the plural image data pieces.

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11. In regards to **claim 11**, Yaung further discloses in col 12, line 7, the clustering unit and the sorting register unit executing clustering and sorting of the image data pieces stored in the image storage unit each time a specific period of time passes.

12. In regards to **claim 12**, Yaung further discloses in col 12, line 1, the device wherein when there is a new image data piece to be stored in the image storage unit after clustering and sorting of the image data pieces stored in the image storage unit, the clustering unit and sorting register unit execute sorting of the new image data piece in such a manner that the new image data piece belongs to a cluster having the highest relation among existing clusters relating to the image data pieces stored in the image storage unit.

13. In regards to **claim 16**, Yaung further discloses in col 12, line 4, the device wherein when a specific time passes after sorting by the sorting register unit, the clustering unit and the sorting register unit destroy the existing sorting and execute clustering and sorting of all of the image data pieces stored in the image storage unit.

14. In regards to **claim 17**, Yaung further discloses in col 6, line 9, the device further comprising an image output unit that outputs image data pieces located near the center of each cluster, of the image data pieces after clustering by the clustering unit and sorting by the sorting register unit having been executed.

15. In regards to **claim 18**, Yaung further discloses in col 6, line 9, the device further comprising an image output unit that outputs image data pieces having a high relation with image data pieces located near the center of each cluster, of the image data pieces after clustering by the clustering unit and sorting by the sorting register unit having been executed.

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16. In regards to **claim 19**, Yaung further discloses in col 6, line 9, the image output unit outputs only the image data pieces relating to a designated cluster.

17. In regards to **claim 20**, Yaung further discloses in col 11, line 67, the device wherein after clustering by the clustering unit and sorting by the sorting register unit have been executed, when clustering by the clustering unit and sorting by the sorting register unit are executed again, the image output unit again outputs image data pieces after being sorted again.

18. In regards to **claim 21**, all the elements set forth in this claim have been addressed in the argument of claim 1.

19. In regards to **claim 22**, all the elements set forth in this claim have been addressed in the argument of claim 2.

20. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 1 above, in further combination with Lim (U.S. Patent 6,574,378 B1, newly cited, "Lim").

21. In regards to **claim 5**, Yaung and Desai do not expressly disclose the clustering unit executing clustering by means of a fuzzy technique that employs the fuzzy theory.

Specifically, Yaung discloses the clustering means using threshold criteria data (col 5, line 18).

Lim teaches a clustering unit (col 7, lines 37-55) executing clustering by means of a fuzzy technique that employs the fuzzy theory.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Lim's clustering unit in place of Yaung's clustering unit because fuzzy clustering is unsupervised (Lim, col 7, line 4) and Lim's fuzzy algorithm is the fuzzy equivalent of a classical "hard" clustering algorithm (col 7, line 38).

22. **Claims 10 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 8 above, in further combination with Hutcheson et al (U.S. Patent 5,161,204, newly cited, "Hutcheson").

23. In regards to **claim 10**, Yaung and Desai do not expressly disclose the device wherein when the image storage unit stores a specific number of image data pieces, the clustering unit and the sorting register unit execute clustering and sorting of the image data pieces stored in the image storage unit.

Hutcheson teaches in col 17, lines 23-27, a device wherein when the image storage unit stores a specific number of image data pieces, the clustering unit and the sorting register unit execute clustering and sorting of the image data pieces stored in the image storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Hutcheson into the device of Yaung and Desai because it provides sufficiently reliable addressing of element clusters over large databases (Hutcheson, col 17, line 41).

24. In regards to **claim 15**, Yaung and Desai do not expressly disclose the device wherein when more than a specific number of image data pieces are added in the image storage unit after

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sorting by the sorting register unit, the clustering unit and the sorting register unit destroy the existing sorting and execute clustering and sorting of all the image data pieces stored in the image storage unit.

Hutcheson teaches in col 17, lines 23-27, the device wherein when more than a specific number of image data pieces are added in the image storage unit after sorting by the sorting register unit, the clustering unit and the sorting register unit destroy the existing sorting and execute clustering and sorting of all the image data pieces stored in the image storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Hutcheson into the device of Yaung and Desai because it provides sufficiently reliable addressing of element clusters over large databases (Hutcheson, col 17, line 41).

25. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 8 above, in further combination with Sato et al (JP 11-136573, newly cited, "Sato").

26. In regards to **claim 13**, Yaung and Desai do not expressly disclose the clustering unit and sorting register unit executing sorting of the new image data piece on the basis of the relation with the characteristic value acquired from the center of gravity of the existing clusters relating to the image data pieces stored in the image storage unit.

Sato teaches in paragraph 0026 the the clustering unit and sorting register unit executing sorting of the new image data piece on the basis of the relation with the characteristic value

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acquired from the center of gravity of the existing clusters relating to the image data pieces stored in the image storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Sato's teachings into Yaung and Desai's device because it enables the addition of information at one time by collecting the whole classification and enabling it to add information by its classification (Sato, paragraph 0014).

27. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 8 above, in further combination with Craver et al (U.S. Patent 6,233,367 B1, newly cited, "Craver").

In regards to claim 14, Yaung and Desai do not expressly disclose the clustering unit and the sorting register unit executing sorting of the new image data piece on the basis of a center value of the relations between the characteristic value of the new image data piece and the characteristic values of the image data pieces each stored in the image storage unit.

Craver teaches in col 7, line 67, the clustering unit and the sorting register unit executing sorting of the new image data piece on the basis of a center value of the relations between the characteristic value of the new image data piece and the characteristic values of the image data pieces each stored in the image storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Craver's teachings into Yaung and Desai's device because the target image can be compared with an entire group (col 8, line 2), thereby saving computational time.

28. **Claims 1, 2, 4, 21, and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Craver et al (U.S. Patent 6,233,367 B1, cited above, "Craver").

29. In regards to claim 1, Craver discloses in one embodiment an image sorting device (Fig 6) comprising: a characteristic value extraction unit (col 7, lines 1-7) that extracts a characteristic value of an image data piece from the image data piece; and a relation evaluation unit (col 7, lines 8-13) that evaluates a mutual relation between the characteristic values that the characteristic value extraction unit extracts from plural image data pieces.

Craver discloses in another embodiment a clustering unit (col 7, line 63) that executes clustering to events expressed by the characteristic values of the plural image data pieces on the basis of an evaluation result of the relation acquired by the relation evaluation unit.

Craver discloses in a third embodiment a sorting register unit (col 8, lines 37-45) that sorts the plural image data pieces on the basis of a result of clustering by the clustering unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine these the first Craver embodiments with the second Craver embodiment because like images would be more likely to be placed next to each other (col 7, line 54). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the first and second embodiments with the third embodiment because it allows easy selection of the target image from any of the displayed images (col 8, line 59) and images further away from the target image is displayed with a smaller size to denote greater dissimilarity (col 8, line 40).

30. In regards to **claim 2**, Craver further discloses the device wherein: the characteristic extraction unit extracts, as the characteristic value of the image data, n types of characteristic

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value vectors (col 7, lines 3-7 and 14-16) expressed by an I_j dimensional vector from the image data; and the relation evaluation unit (col 7, lines 8-13), synthesizing n types of the characteristic value vectors as to each of the n types of the characteristic value vectors that the characteristic value extraction unit extracts from the plural image data pieces, evaluates the relation between the image data pieces in a synthesis result.

31. In regards to **claim 4**, Craver further discloses in col 7, line 50, the device wherein the clustering unit executes clustering by means of a hierarchical method that joins clusters on the basis of the relation between the clusters.

32. In regards to **claim 21**, all the elements set forth in this claim have been addressed in the argument of claim 1.

33. In regards to **claim 22**, all the elements set forth in this claim have been addressed in the argument of claim 2.

Conclusion

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. **Caid et al** (U.S. Patent 6,173,275 B1) discloses representation and retrieval of images using context vectors derived from image information elements.

35. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher T. Sukhaphadhana whose telephone number is 703-306-4148. The examiner can normally be reached on 9a-4p M-F.

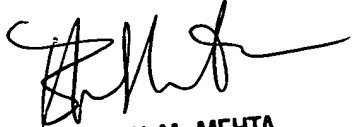
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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